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strength. Thus all the strain came on the back rope, which was also torn away, and the canoe swept down the stream with unchecked speed. We now gave chase, with the intention of swimming off to her; but, from the precipitous character of the banks, she was swept away fully six miles to our one, and was soon out of sight. Evening had now set in, and darkness quickly closed on us, which, together with the loss of all the instruments, cooking-utensils, axes, &c., made our camp most miserable, several of us being without blankets and tents, and our only consolation being that we had plenty of flour on shore. I now determined on returning next day by the side of the river, with the hopes of perhaps recovering the instruments. After three days' toilsome journeying, we discovered portions of the canoe, broken across the grain into several pieces; as also a tomahawk, which had by some chance got jammed into one of the pieces of the canoe, testifying to the tremendous force of the rapids through which she had passed.

XXI.—*On the Highland Region adjacent to the Trans-Indus Frontier of British India.* By Major JAMES WALKER, of the Bombay Engineers, &c.

BETWEEN the crest of the Soolimani range and the well-known routes from Upper Sind to Kandahar, Ghuzni, and Kabul, there lies a tract of hill country extending over 5 degrees of latitude and 2 degrees of longitude, of which little is known up to the present date. Chiefly inhabited by tribes of fanatic Mahomedans, whose hands are against every man, and every man's hands against them, these hills are peculiarly difficult of exploration. Though they have been crossed at one or two points by Europeans in disguise, they have only once been avowedly entered by British officers, on the occasion of the memorable mission of the brothers Lumsden in 1857-58 from Peshawur to Kandahar, through the valley of the Koorum, which lies on the southern skirts of the Safed Koh mountains, where it abuts at right angles against the Soolimani range.

Like the Scottish Highlanders of old, the inhabitants of these hills prefer to subsist on the wealth of their lowland neighbours rather than on their own exertions. Occasionally their raids are directed against British subjects, when it becomes necessary to despatch a force against them to exact retribution for past offences and security for future good conduct. On these occasions opportunities are presented for acquiring some knowledge of the geography of countries which are otherwise sealed to Europeans.

During the progress of the operations of the trigonometrical



Map showing
Recent acquisitions to the Geography of the Districts
Bordering the
BRITISH TRANS-INDUS FRONTIER
between
Peshawur and Dera Ishmael Khan
Compiled under the Superintendence of
Major J.T. Walker, F.R.G.S.
Sup^d G.T. Survey.

English Miles.

10 20 30 40 50 60

Long. East of Greenwich

survey along the line of the Indus from Attock to Karachi, projects were often formed for ascending the peaks of the Soolimani range, with a view to extending the triangulation westwards. The whole of these peaks have been accurately fixed, and, as they command extensive views, they would form excellent stations for observations. Towering high above all the others is the Tukht-i-Sooliman, the Throne of Solomon, which is situated at no great distance beyond the British boundary, opposite the town and cantonments of Dera Ishmael Khan. It has for many years been viewed with longing eyes, not only by surveyors but by all Europeans located in the neighbourhood, who are naturally anxious to exchange the oppressive heats of the Derajat for the bracing climate of the high mountains. The Tukht is celebrated as one of the many fabled resting-places of Noah's ark. Its summit, described as a narrow plateau about 5 miles long, stretches from north to south, with culminating points at either extremity, the northern peak being 11,300 feet above the sea, and the southern only 220 feet lower. Thus from this one mountain alone a vast addition might be obtained to our knowledge of the country beyond. Its two peaks would form the base of trigonometrical operations extending over upwards of 10,000 square miles of a terra incognita. So short a base as 5 miles would necessitate the employment of superior instruments, that the acute angles subtended by far distant objects might be determined with the requisite accuracy; but, on the other hand, the difficulty of identification, which occurs when stations of observation are far apart, would be avoided.

There are probably few mountains hitherto unvisited by geographers which might be made to yield so rich a harvest of information as the Tukht-i-Sooliman. But political difficulties have hitherto compelled the Punjab Government to refuse to permit any British officers to attempt its ascent, which therefore still remains to tempt the hardy and adventurous explorer with its certain perils and prospective rewards.

The Soolimani range, as seen from the Indus, appears to rise from the plains like a wall, parting the eastern watercourses from the western; but on nearer approach it is found to be pierced at numerous points by streams, which take their rise far west among hills lower than the outer range through which they break ere entering the plains. A similar feature characterizes the Himalayas, where the principal watersheds lie in the remote interior beyond the pinnacles whose heights give celebrity to the range. Sir Jung Bahadoor pointed out this circumstance, when he was in England, and observed that our map-compilers had greatly lessened the apparent size of Nepaul by drawing straight lines between the chief peaks to represent the watershed, which in reality lay 30

miles, on an average, farther towards Chinese Tartary. The interior ranges would seem to be of a greater mean elevation than the stupendous outer ranges, and to preserve a more uniform level. Though the peaks of the latter are highest, their gorges are lowest, and thus permit the exit of the waters of the interior to fertilize and enrich the plains below.

The rivers of the Soolimani range have little in common with those of the Himalayas. They scarcely merit the designation of rivers; for even when of considerable length they are but the dry beds of watercourses during the greater portion of the year. There is little moisture to feed them in their parent mountains, which are insignificant in mass and altitude compared with the Himalayas, and desiccated by the heat radiated from the extensive plains to the east and west. Vegetation is scarce; the soil is dry and arid; pine-trees are not to be met with at a lower elevation than 9000 feet; and the climate of any given altitude would find its equivalent in the Himalayas 2000 or 3000 feet nearer the sea-level.

Thus the Gomul river, which takes its rise in the hills near Ghuznee and has several important affluents from the south, probably drains an area of 13,000 square miles. During the rains it stretches over the plains below Dera Ishmail Khan to a breadth of 10 miles; but in ordinary weather it dries up, or is absorbed for purposes of irrigation, before it gets half across the plains on its way to the Indus. None of the other rivers get even thus far, excepting when swollen by rain. The Takke Zâm, though rising in mountains upwards of 11,000 feet high, reaches the plains as a feeble stream, barely sufficient to irrigate the lands of the little town of Tâk. On the maps these rivers appear to end as they began, in little streamlets; and it would be difficult to guess their direction, and to distinguish their beginnings from their endings, but for the hill-shading which indicates the higher ground where they must needs originate.

The maps accompanying this paper exhibit the latest acquired information of the tract of country between the Gomul river and the Safed-Koh range, the British boundary, and the city of Ghuzni. It is only here that any recent additions of importance have been made to our geographical knowledge of the districts beyond the Trans-Indus frontier. These additions are due—1st, To a survey of the Koorum Valley as far west as the Paiwar Pass, by the late Captain Garnett, Bengal Engineers, and Captain Peter Lumsden, Assistant Quartermaster-General, during the Koorum Expedition in the autumn of 1856; 2nd, To the extension of this survey to Ghuzni by Captain Lumsden, while accompanying his brother on the mission to Kandahar in 1857-58; 3rd, To a reconnaissance of the country of Kabul Khel Wazeeris by Captain Johnstone, Topo-

graphical Surveyor of the Derajat, in 1859; and lastly, to a reconnoissance of the Mahsood Wazeeri district in 1860, in connection with the trigonometrical survey. The belt of country between the western boundary of the Derajat and the crest of the Soolimani range has been surveyed with more or less accuracy by Captain Johnstone in connexion with his topographical operations; and being shown in his maps, which are in course of regular publication by the Surveyor-General of India, need not now be described.

All but the second of the operations above enumerated were accomplished during military expeditions under the command of Brigadier-General Chamberlain, C.B., to check the forays of the hill tribes. The Koorum expedition entered the territories of Dost Mahomed Khan, the ruler of Kabul, who, being unable to control his own subjects, consented that a British force should proceed among them to effect the restitution of stolen property. This was accomplished without resistance or opposition of any kind. The Naib, or deputy-governor of the district, accompanied the expedition to render assistance, and is believed to have made use of the opportunity to collect revenue for his master under the protection of the British force. Thus the whole Koorum valley, from its eastern entrance beside the British boundary, was peaceably surveyed as far westwards as the Paiwar Pass. Shortly after the return of our troops to their respective stations on the Punjab frontier a marvellous change came over our political relations with the frontier tribes. The great mutiny of the Bengal army commenced, and the Punjab troops were again collected together to be marched, not westwards, as hitherto, against external foes, but eastwards into the heart of British India, against soldiers who for many generations had served under the British banner. They shared in all the operations of that eventful crisis, the siege of Delhi, relief of Lucknow, and battles and skirmishes innumerable. Meanwhile their places on the frontier were taken by the very men who, hitherto only encountered as the foes of the British Government, had now become its servants and supporters.

Of all the tribes along the Punjab frontier, only the Wuzeeris held sullenly aloof from us during this critical period. They continued to make petty aggressions, which for a time could only be checked by defensive measures, such as strengthening the outposts. But when the mutiny had been trodden down, and the Punjab troops returned, with many a blank in their ranks, to their stations on the frontier, we were in a position to demand more respectful treatment in future, as well as compensation for past losses.

Thus in the winter of 1859-60, just three years after the Koorum expedition, Brigadier-General Chamberlain led a force against the northern or Durweshkel Wazeeris; and in the following spring

another force against the southern or Mahsood branch of that tribe. And so the four years 1856-60 have witnessed considerable additions to our knowledge of territories never before trodden by Europeans, notwithstanding that for the greater portion of that period we were at war with almost all India, and often struggling for bare existence.

When the geographer has before him the results of the expeditions so happily conducted by General Chamberlain, and then turns to the map of Asia and notices how much is still unknown of the countries beyond the British boundary all along from Peshawur to Eastern Assam, he cannot repress a feeling of disappointment at the passive obstruction of the inhabitants of Chinese Tibet and Tartary, nor restrain a preference for the manners and customs of the Wuzeeris, which necessitate active measures on the part of the British Government and result in expeditions of exploration.

The range of mountains known as the Soofaid, or Safed Koh, forms the northern boundary of the tract of country now under notice. Rising out of the high table-lands south of Kabul, it follows the parallel of 34° of latitude for about 100 miles, then turns to the N.E. on approaching Peshawur, and terminates on the Kabul river opposite the hills of the Momunds and Bajour. Its highest point is the Seekaram Mountain, 15,622 feet above the sea, whence the range preserves a tolerably uniform level, perhaps nowhere less than 12,500 feet, until it again culminates in a double peak mountain, whose summits average 14,800 feet. I have been unable to learn the local names of these peaks, or whether, like the Seekaram Mountain, they tell of a remote antiquity, when the country was ruled by Hindoos, long anterior to the origin of Mohammedanism.

The offshoots of this range have usually an east and west direction, and are remarkable for their parallelism with each other and the parent range. The most important, though not the highest, of these stretches away to Attock, and is the southern boundary of the Peshawur Valley, dividing it from the system of valleys of which the Kohat district is composed. Before entering British territory it forms the southern barrier of the Teerah Valley, the home of the Oorukzai Affghans, which is celebrated throughout the surrounding regions for its beauty, fertility, and genial climate, and which no European has ever yet entered.

North of Teerah is the Valley of Bara, of less size and importance; while next beyond, and somewhat towards the north-east, is the world-famed Khyber Valley, the principal gateway of northern India, through which all the western invaders of Hindoostan have marched their forces, and which British troops have stormed on more than one occasion. The watershed of this pass is at an alti-

tude of 3400 feet above the sea, and 2200 feet above the Peshawur Valley. It is on the main range, which, ere it terminates in the valley of the Kabul River, rises once more to a height of 6800 feet at the Tartarra Peak, of familiar aspect to all who have resided in Peshawur.

South of Teerah is the Alisherezhai Valley, which again is separated by the Samana range from the continuous British valleys of Meerunzai and Hungoo, inhabited by the Bungush tribe, who are subject to the British Government.

The general parallelism of the ranges offshooting from the Soofaid Koh is very advantageous in enabling a surveyor to determine approximately the positions of the villages which are hidden in the valleys below. Facing them at right angles to their prevailing direction, he bids his native guides point the telescope of a theodolite towards each village in succession. Their local knowledge enables them to do this with considerable accuracy, as is easily tested by recording the reading of the instrument, throwing it off the direction given by one man, and letting the others set it in turns on the required position. The accordance between the values thus obtained from different persons is most surprising, particularly when the informant is a pugnacious Pathan, who is told to lay the theodolite as he would a matchlock on an enemy dwelling in the place whose position is to be determined. All the best known and most important villages have been thus fixed probably within a mile or two of their true positions; for the valleys are narrow, and the crests of the limiting ranges on either side being clearly visible from the stations of the survey were fixed by actual measurement.

That "events repeat themselves" is a law of Nature, which is stamped on the mute records of the earth's crust as legibly as it is written in the histories and annals of her inhabitants. It is well illustrated in these districts, where, throughout extensive tracts of country, marked similarities of effect are often met with which point to the repeated action of similar causes. The singular parallelism of the above-mentioned ranges is the more remarkable, as being found to occur even when they deviate from their normal direction of west to east. Thus the Teerah River, on approaching Kohat from the west, turns to the north, and then back westwards for a long distance before it finally resumes its easterly direction. A course precisely similar to this is taken by the waters of the adjacent Kohat Pass, in which the abnormal deviations of the Teerah River are repeated on a smaller scale. In the low sandstone ranges the valleys are usually straight and parallel to each other, and are connected at right angles by abrupt gorges, through which water falls from the higher valley to the lower in a succes-

sion of drops more or less perpendicular. The waters pass over two sides of a parallelogram, rushing in straight lines from angle to angle, instead of meandering along the diagonal.

In the limestone ranges the north-western faces are uniform slopes of 30° to 60° , without spurs; while the opposite faces are scarped and rugged, and overhang great spurs, which are separated by deep gorges very difficult of access. This often-recurring feature may be aptly illustrated by arching one's hand on a table: then, if the knuckles are taken to represent the watershed of a range of limestone tending north and south, the back of the hand will represent the smooth western slopes, and the open fingers the eastern spurs with their deep dividing gorges. In the high sandstone ranges the western slopes are similarly smooth from top to bottom; but, instead of being continuous for some distance longitudinally, they are broken into spurs resembling those on the opposite side of the watershed, excepting that the western slopes face away from the crest of the range, while the eastern slopes face towards it. This is owing to the general parallelism of the strata, and their dipping towards the same point of the compass. The dip is usually about 50° , and the prevailing appearance of the spurs and their offshoots is as if they were formed of a succession of triangular slates, like inverted Vs, gradually diminishing in size as they approach the foot of the range. The sandstone is of a very soft, friable nature; masses falling from a height into the watercourses are instantaneously disintegrated and turned to sand by the shock, and swept away by the first shower of rain. But the rock invariably wears in layers parallel or perpendicular to the original stratification, and thus the features of the range are little altered by degradation, and are never rounded off, as is the case in ordinary formations. The watercourses are limited to two directions, which are either perpendicular or parallel to the trend of the range, and it is thus their special characteristic to be incessantly turning corners at right angles without sensibly rounding their channels. The watersheds are invariably narrow, both in the limestone and sandstone ranges: in the former they are usually flat, in the latter jagged and serrated. High table-lands are sometimes formed in the trough between two ranges of sandstone and limestone, when in close juxtaposition; but in neither formation are the crests more than a very few feet wide, often narrowing to mere knife-edges, with a deep perpendicular drop on one side and a perilous slope of 60° on the other, rendering it necessary for all but the most skilful mountaineers to go over straddling, with one leg on either side the mountain.

The principal river of the southern valleys of the Soofaid Koh is the Koorum, which rises at the junction of the Soolimani range with the Soofaid Koh. Among its chief sources are two streams:

one going eastwards from the Shooturgurdun, or Camel-neck Pass, the other westwards from the Paiwar Pass through the Hurriab Valley ; they unite in the Chumkunni district, where they are joined by streams issuing from the valleys of the Mungulo ; the combined waters enter Koorum in one broad and deep torrent. The two passes just named are on the direct road from Kohat to Ghuzni ; the Shooturgurdun is on the watershed of the main range, and is no less than 11,500 feet high, as determined by Captain Lumsden's observations. The Paiwar Pass is not on the main watershed, but merely over a prominent spur from the Safed Koh. It is about 7000 feet high, and derives its name from the populous and wealthy town of Paiwar at the foot of its eastern ascent. It can be avoided altogether by a circuitous route through the Chumkunni district to its south.

In the Report of the mission to Kandahar the Koorum district is described as "picturesque and attractive in the extreme to an European stranger fresh from the plains of India. A clear and rapid river, which has its sources in the pine-clad slopes of the Safed Koh mountains, which shut in this valley on the west and north, rushes in a winding rocky bed down the centre of a deep fillet of rich cultivation sprinkled with villages, each having its clumps of magnificent plane-trees, while the distance is everywhere closed by the ever-varying aspect of the noble mountains just mentioned, which tower over the valley in its whole length.

"In the centre of this district, and about 25 miles from the Paiwar Kothul, stands the fort of Kurram, the residence of the local governor. It is a square mud enclosure, with faces about 100 yards long, having 'burjes,' or round towers, at the angles and in the centre of each face. The district is part of Sirdar Muhammad Azim Khan's jagir, and yields about 60,000 rupees per annum, of which some 12,000 rupees are collected as transit-duty on kafillahs, and the remainder is land revenue. The Sirdar seldom visits the country himself, but governs it through a deputy or 'naib.' Collections can only be made by a considerable force, which is usually sent over from Cabul, and, when it does arrive, sweeps the whole country clean before it. The soil produces both the robbi and kharif crops, the chief product being rice, which is cultivated in sufficient quantities to admit of extensive exportation to Cabul and neighbouring countries. Wheat, barley, Indian corn, and a little cotton are also grown.

"All the irrigated lands are close along the banks of the river, and whenever extraordinary floods sweep away any portion of these fields, it is a common practice to plant rows of willows, as thickly as they will stand, and to keep them cut down to two or three feet in height for some years. These, spreading, form a very complete barrier, which in ordinary floods catches and retains

a rich deposit of alluvial soil; when dry, a crop is sown on it, while each succeeding flood only adds to the depth of the deposit. The cultivator loses but one crop, and in a very few years regains a fine field supported on a living willow wall.

“Between this cultivated tract along the bank of the river—on the edge of which most of the villages are placed—and the bottom of the lowest slopes of the Safed Koh (called by the natives Tissin Ghur), lies an unculturable tract, varying from 2 to 10 miles in breadth, and sloping down towards the cultivation, where it terminates in an abrupt bank, having a command of from 20 to 60 feet above the irrigation. It is barren and strong, and intersected by numerous deep ravines, down which flows the drainage from the adjacent mountain.”

The Koorum district is inhabited by the Toori tribe, who, says Colonel Lumsden, “with their neighbours the Jagis, are supposed to be of Mogul origin, and are not considered Pathans, from whom they differ in physical appearance, dress, and many customs.” Below this district the course of the Koorum River is s.s.e., through a valley that is more or less closed in on both sides by hills which are inhabited to the north by Zymookht Affghans and Bungush tribes subject to the British Government, and to the south by Wazeeris. At length the river passes into the plains of Bunnoo, where its waters are turned aside into numerous canals for purposes of irrigation.

Its most important affluents are the rivers of Khost and Dour, both of which take their rise in the northern prolongation of the Soolimani range. Khost is described as more of the shape of a basin, than of the narrow strip of plain fenced in by hills which is the prevailing type of these valleys. It is drained by three streams, the most important of which is the Shamil Nuddi. All three unite into the Keyti, which falls into the Koorum about 11 miles above Bunnoo. Khost is subject to the ruler of Kabul, and pays him revenue, but only when troops are sent to collect it. The inhabitants live in small hamlets scattered apart from each other. They have no large villages; they are divided into numerous clans, the respective localities of which are approximately shown on the map, as gathered from native information.

Between Khost and the British boundary, which on the parallel of 33° 15' recedes 20 miles eastwards, there is a network of low hills on both sides of the Koorum River, forming part of the lands of the Wazeeris. This important tribe has two principal divisions, the Derwesh Khel and Mahsood: the former occupying the northern lands of the tribe, and the latter the southern. Both are subdivided into numerous khels or clans, one of which, the northern Kabul Khel, caused by its aggressions the first British expedition into the territories of this tribe.

The Durwesh Khel Wuzeeris "are a wild wandering race, living in black tents, called in their language Ghizdis." Like the pastoral races of the Khirgiz steppes in Central Asia, their wealth is in their flocks and herds. A very few have been induced to settle and cultivate lands and build houses in the Bunnoo Valley. In the winter months the grazing grounds of this tribe are among the low hills adjacent to and within the British frontier, but in summer they betake themselves to the Turghar Mountains, where the Dour River is said to rise. Though of Affghan descent, they pay no revenue to Kabul.

Dour is a rich and highly-cultivated valley, having a considerable breadth of land within reach of its fertilizing river. The sources of this river are still uncertain. Viewed from Bunnoo, it would seem to rise in the line of hills connecting the Tukht-i-Sooliman with the Safed Koh. But the volume of water it discharges suggests a far more distant origin, and there seems much reason to believe that it rises beyond Oorghonj, in the southern slopes of the Zoormut Mountains. Probably the eastern slopes of the Zadran range also drain into this river, in which case the true Soolimani watershed must here lie more than a degree to the west of the line joining the highest mountains of the range. The river is called the Lochee while within the hills, and the Gumbela when it enters the plains of Bunnoo. Below the fort of Lukki it merges its waters and name into the Koorum River, which, after a further course of about 20 miles, falls into the Indus.

From the plains of Bunnoo and the northern Derajat two lofty blue mountains are visible in the west, where the Mahsood Wazeeris have their summer residences. One of these, the Pirghul, near the town of Kanigoorum, is 11,580 feet above the sea-level, or about 280 feet higher than the Tukht-i-Sooliman; the other, Sheweydur or Shah Hyder, is 300 feet lower than the Tukht. Both more closely resemble the mountains of the Safed Koh range in appearance and geological structure than the portion of the Soolimani which lies between the parallels of 28° and 32° , immediately adjacent to the plains of Derajat, where nummulitic limestones predominate, and the formations generally are comparatively recent. There would seem to be a gradual transition from one range to the other, in direction as well as formation.

Between the highlands of the Wuzeeris and the plains of the Derajat there are belts of low hills of sandstones and conglomerates, which are inhabited by a small tribe of Pathans known as the Bittunnies. In these outskirts of the Soolimani range there are long narrow strips of valleys, suggestive of the well-known Dhoons between the Siwālihs and the Himalayas. But the Bittunni Dhoons are very unlike their Himalayan prototypes. They are bare, stony, and uncultivated; for the streams from the higher

hills, in passing through them, rush across abruptly breadthways, with a minimum length of course, and too low depressed for their waters ever to rise to the surface of the plains on either side; whereas the Himalayan Dhoons are watered by streams which wind through their whole length and linger among them until they leave no portion unfertilized.

In the Bittunni Dhoons there is another exemplification of the tendency to repetition, already noticed in the action of the forces to which the present features of the ground are due. The successive belts of plains, locked in between the hills and the streams from the interior, slope continuously southwards, like the glacis of a fortification, from the scarped bank of one stream to the brink of the next. They have no middle waterparting, as might naturally be expected, but each drains into a single stream. This feature is repeated, on a large scale, in the Ruzmuk plain, beyond Muk-keen, which slopes gently southwards; while to the north it terminates in an abrupt scarp over the valley of Kissarah.

The portions of the stream-beds which are intercepted between the hills and the Dhoons bear some resemblance to the crater of a volcano, the surrounding strata dipping concentrically to all points of the horizon. The outer and lower hills dip generally towards the east, and the minor ones towards the west, though occasionally anticlinal strata are to be met with in both.

In the accompanying note by Dr. John Lindsay Stewart, of the Bengal Army, on the flora of the country passed through by the expeditionary force against the Mahsood Wazeeris, which the author has kindly placed at my disposal for a submission to the Royal Geographical Society, the route of the expedition is so closely described that nothing further need be said on the subject.

Two copies of a map constructed on the occasion, on the scale of 2 miles to 1 inch, and subsequently lithographed in the Surveyor-General's office in Calcutta, are herewith forwarded in addition to the manuscript map, scale 8 miles to 1 inch, expressly prepared to accompany this paper. The lithographed map shows at a glance the physical characteristics of the district,—the hills, the shingle plateaux called “*rughzas*” by the Wazeeris, and the negative, or “*river valleys*,” as they are appropriately designated by Dr. Stewart. The green spots indicate lands under cultivation, which will be seen to be chiefly carried on in the beds of the mountain-torrent, where the waters are made to deposit their sediment and form fields, in the manner described by Colonel Lumsden. Occasionally portions of the *rughzas* are cultivated, irrigation canals being brought to them from considerable distances. Much ingenuity is exhibited in carrying these canals along the face of the hills, and tunnels have often to be excavated for this purpose.

Water is the great want of the country. For lack of it the

Dhoons and rughzas usually bear only thin grasses and stunted bushes; whereas they have a sufficiency of rich soil to yield luxuriant crops of wheat and barley, if only they could be irrigated. Thus extensive tracts remain spell-bound, and the surface of the lands under cultivation, on which the inhabitants chiefly depend for their cereals, does not amount to more than 2 or 3 per cent. of the whole district. Under such circumstances, it is no wonder that the fanatic Mussulman mountaineers should readily bring themselves to believe that there is a wild justice in their favourite pastime of plundering the inhabitants of the rich plains at their feet, and that they are fairly entitled to obtain a forcible restitution of the rights which heaven must have intended for Mussulmans rather than Hindoos, and for stalwart highlanders rather than the puny inhabitants of the plains.

The range of hills immediately west of the Bittunni Dhoons is chiefly composed of the peculiar sandstone formation previously described in detail, whose strata are disposed in such a manner that they appear like a pile of V-shaped slates leaning against each other, with the points of the Vs upwards. West of these are low hills of limestone, somewhat akin to what have been already described as associated with this kind of sandstone, but comparatively insignificant in size and extent. There are also some instances of sandstone ridges, which curve round like horse-shoes, and present perpendicular scarps externally; while the ground enclosed by the watershed slopes gently inwards, and is more or less elevated above the surrounding country. This horse-shoe form is very prevalent in the low hills of the salt-range between Kohat and Bunnoo.

The river-valleys vary in breadth from half-a-mile to a few feet, being narrowest when breaking through the axis of a range, and broadest just before doing so, when the waters sometimes rise like a lake behind the barriers which impede their progress. Here there are usually little oases of cultivation. The main roads of the country traverse the watercourses, and during rains are sometimes closed for days together. The barriers are called "tungs," or narrows, by the natives, and are usually the places which they select to make a stand against external aggression. At the Junis Tungi—the first through which one passes ascending the Tâk-ke-zâm—a Sikh army was successfully opposed, and we expected opposition, but passed through without seeing a foe.

A little above is the junction of two rivers: one coming from Kanigoorum, Mukkeen, and the northern valleys, the other from Shahoor. Here a portion of the force was left under command of Colonel Lumsden, encamped on a "kuch," or patch of culturable land—so called from the native word "kucha," unbaked, green—while the remainder advanced up the Shahoor Valley, under

General Chamberlain, with the intention of exploring the country and visiting a set of noted marauders known to be located in this direction. The Wazeeris availed themselves of the separation of the force to make a night attack on Colonel Lumsden's brigade; they succeeded in overpowering the pickets, and entering pell-mell with them into the camp; but after a sharp hot fight, in which we lost more than 200 men killed and wounded, they were repulsed with heavy loss, and pursued for several miles towards the higher ranges. When General Chamberlain's column returned, the reunited force proceeded up the Zâm towards Kanigoorum, passing through several tungis, but opposed only at one, the Barara Tungi, where the Wazeeris and their allies were collected, to the number of nearly 10,000, to oppose our progress. They had barricaded the pass, and added to the natural strength of the position by numerous breastworks constructed along the crests of the hills. Here one of our assaulting columns suffered a temporary reverse, but soon rallied, and drove the enemy out of a very strong position, though not without a loss on our side of one officer killed and some 80 men killed and wounded. Our further progress was not opposed, but distant shots were fired into the column daily, and the rearguard was always more or less engaged with the enemy.

On reaching Kanigoorum we found that the women and cattle had been taken to the summits of the range above. This was unfortunate, as there was thus no possibility of ascending the Pirghul and Shah Hyder mountains, to obtain the long-wished-for view beyond, without hazarding the loss of many valuable lives, for which a survey would not have been a sufficient equivalent. Moreover, we eventually became in want of provisions, because we were disappointed in our expectation of replenishing our commissariat at the town of Kanigoorum, and were wholly dependent on the supplies originally brought with us from the plains; consequently our return was necessarily somewhat hurried, and time did not even permit for a survey of the country between the Tâk-ke-zâm and the valley of Kissara, through which we marched on our way back to British territory.

There are two chief towns in the country of the Mahsood Wazeeris, Kanigoorum and Mukkeen. The former consists of about 1200 houses, which are picturesquely built on the sides of a narrow ridge, isolated from the surrounding hills. The outer walls of the houses rest on fir poles planted vertically into the slope of the hill, with horizontal timbers thrown across, which form a flooring for the rooms above and cover over the ground below. The chief roads of the town pass under these covered ways, which are, however, barely high enough for horsemen to ride under. Mukkeen contains nearly as many houses, but they stand in several

separate groups, and are not so imposing in appearance as Kani-goorum. Iron-ore is found in the surrounding hills, and yields a metal which is highly prized by the natives, and is exported in considerable quantities into British territories. Every village and hamlet has its smelting-furnace, constructed with a conical roof of long poles planted nearly vertically in the ground. The ore is poor and scanty, and the iron extracted from it is said to owe its value chiefly to being smelted with charcoal.

Perhaps the most remarkable feature of the whole district is the Ruzmuk plain before alluded to, which lies right across the watershed of the range connecting the Shah Hyder and Gubbur mountains, and is 7 miles long by 2 on an average broad, with a mean elevation of 6,800 feet above the sea. It has a very gentle slope southwards, and its waters drain into the Tâk-ke-zâm. On the north it terminates abruptly in a perpendicular scarp of about 400 feet over the valley of Khissara. Here the road descends down a spur, and is narrow and difficult, but a few hours' labour rendered it practicable for our 9-pounder guns to descend, dragged by horses. If ever our relations with the Mahsood Wazeeris are sufficiently friendly, we may find the open and elevated plain of Ruzmuk admirably adapted for cantoning European soldiers. The soil is sandy, and vegetation is not too luxuriant to be unwholesome. Within 5 miles there are mountains 11,000 feet high, on which sanatoria might be established. Judging by the inhabitants, the climate must be peculiarly healthy; for they are handsome, well made, and vigorous beyond the average even of Affghan mountaineers.

Office of Trigonometrical Survey of India, Calcutta,
March 30th, 1862.

XXII.—*Notes on the Flora of the Country passed through by the Expeditionary Force under Brigadier-General Chamberlain, against the Mahsood Wuzeeris; April 17th to May 19th, 1860.*

By JOHN LINDSAY STEWART, Esq., M.D., Assistant-Surgeon.

PREVIOUS to the end of 1859 the tract of country which includes our trans-Indus territories and the mountains to the westward, *i. e.*, from Peshawur to Mittunkote, and from the Indus to Ghuzni, was a *terra incognita* to botanists. On all sides of this space circumstances had enabled more or less to be done to elucidate the flora, but the district I allude to would, in a botanical chart, have been a perfect blank. In these circumstances, and especially in these days, when access to an unexplored district—acmé of delight for the pursuer of any branch of natural history!—is so rare, I